

***PSA WITH ADSORBENTS SENSITIVE TO CONTAMINANTS*****ABSTRACT**

- Disclosed embodiments address contaminant management challenges that arise during production of desirably contaminant free product fluid in the operation of PSA equipment, and
- 5 further address the more serious challenges that arise under intermittent operation of PSA equipment. One disclosed embodiment of a PSA apparatus, intended primarily for normal operating cycle speeds of at least 3 cycles per minute, includes a breather fluidly coupled to a feed end of an adsorber with a contaminant-sensitive adsorbent. The breather can be coupled to the feed end through a shutoff valve closed during production and open during shutdown.
- 10 Other disclosed embodiments of the PSA apparatus used particular sealing strategies for additional sealing of the apparatus, or at least components thereof, from contaminant ingress. For example, one embodiment comprises a buffer seal for receiving a buffer gas having a contaminant vapor content substantially the same as or less than a product gas produced by a pressure swing adsorption process over the adsorbers. The buffer chamber may have flushing
- 15 circulation provided by delivered product flow. As a second example of sealing strategy, a parking seal can be used that typically is engaged when the apparatus is parked. The parking seal can be used alone, or in combination with other contaminant management features. Embodiments of a method for reducing adsorbent degradation by contaminant adsorption while producing a product gas also are described comprising providing described embodiments of the
- 20 PSA apparatus or system, and operating such PSA apparatus or system to produce a product gas. Various embodiments for operating a PSA apparatus and system during normal product delivery, shutdown, park and start up modes also are described.